



Pavla Hanáčková • Diarmuid Ó Catháin

ROCKETS



ALL ABOARD!

ROCKETS

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Albatros

Every night, a wingless little kiwi bird named Karl woke up and rushed from his bed to look at the breathtaking night sky. His biggest dream was to explore space on his own. But what could he do? He couldn't fly after all.

If only I could be known as Karl, the great space explorer!

Karl tried jumping reeeeeaal high! But it didn't help him get to space.



Then he tried building his own rocket. But paper boxes are no good for flying.



Maybe if he invented his own spacesuit, that would be the solution! But Karl didn't know anything about inventing things.



He was puzzled.



He rushed to the library...



But then he had an idea.

That's it! I need to join a **SPACE CREW!**



Ready to launch! 3...2...1...

One of the most exciting moments of each spaceship mission—apart from the mission itself—is the launch. Watching the fuel burning up and the smoke coming out, listening to the roar of the engines, counting down the time until liftoff... Everybody feels relieved and happy when the spaceship successfully lifts off into space!



LIFT OFF!

I can't wait to try it for myself!

Mission Control Center

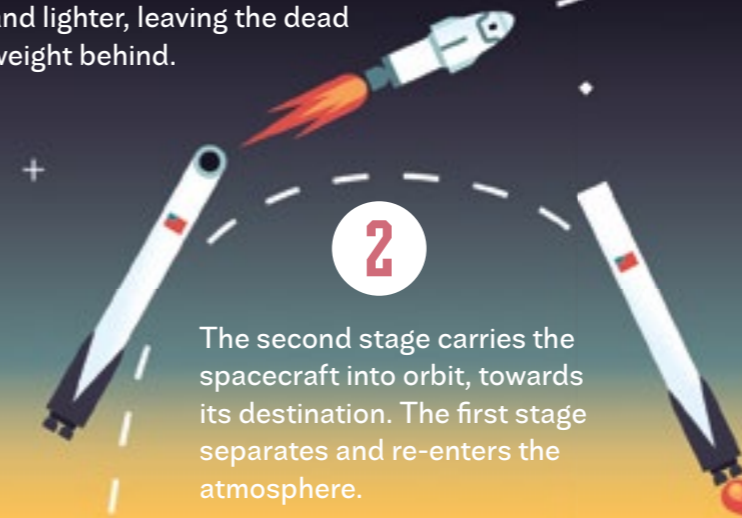
Welcome to the control room! It's a very important place—from here, the controllers supervise the launch as well as the spaceship's journey. Prior to the launch, a team of engineers checks the spaceship from top to bottom, making sure even the tiniest part is working properly.



Stages of the launch

Rockets are made of sections, called stages. Each stage is fueled by its own fuel tank. Once the fuel is used up, a rocket falls off. This way the spaceship becomes smaller and lighter, leaving the dead weight behind.

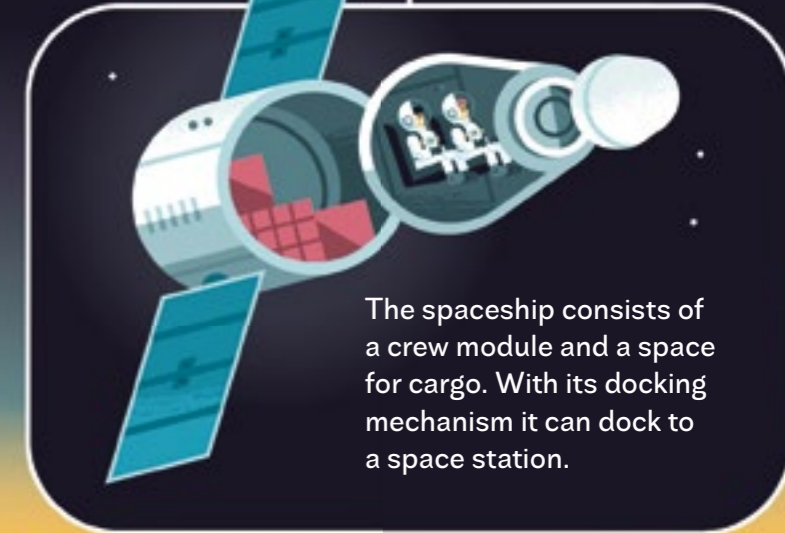
The spaceship separates from the second stage.



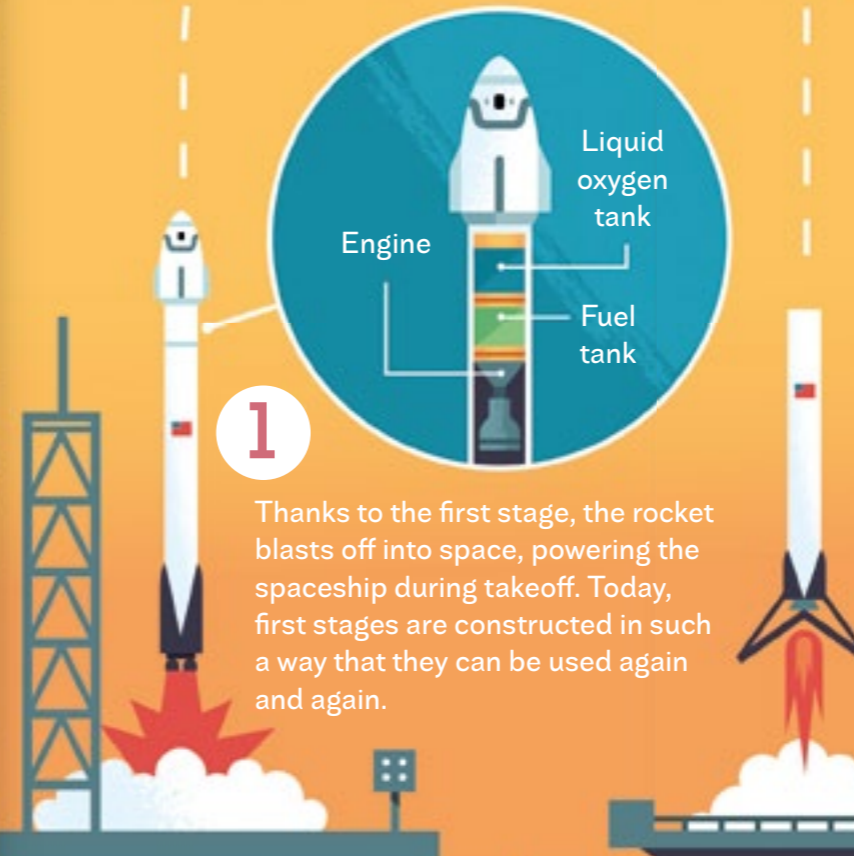
2

The second stage carries the spacecraft into orbit, towards its destination. The first stage separates and re-enters the atmosphere.

3



The spaceship consists of a crew module and a space for cargo. With its docking mechanism it can dock to a space station.



1

Thanks to the first stage, the rocket blasts off into space, powering the spaceship during takeoff. Today, first stages are constructed in such a way that they can be used again and again.

4

New, state-of-the-art engines can even ignite and bring the first stage down to safely land on a platform in the ocean.



Space shuttles are part rocket and part airplane. They can be used multiple times! After completing the mission, they land safely on Earth like airplanes.



Rockets that changed history

Rockets are powerful. But it takes plenty of time and money to make them. Many of them can only be used once! Despite this, they help us a great deal. They help us to carry robots, satellites, and even people into space. Let's get to know some of the most famous rockets in history.



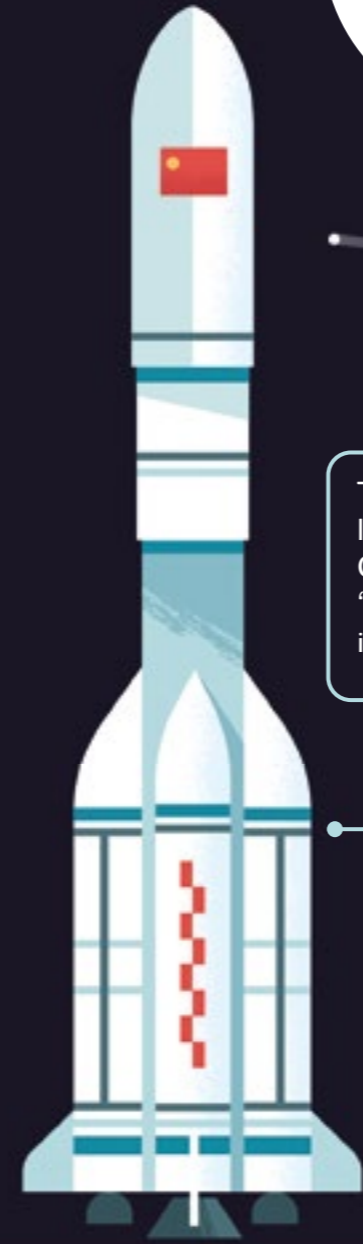
This mammoth spaceship developed by SpaceX is very powerful and will help us send big payloads into space. In 2019 it completed the first ever commercial launch.



Discovery was NASA's busiest space shuttle. Over 27 years of service, it launched and landed 39 times. It helped build the ISS and also carried the Hubble Space Telescope into orbit.



Falcon Heavy



Long March 2F

This marvelous rocket launched the first Chinese astronaut—or "taikonaut"—Yang Liwei into space in 2003.

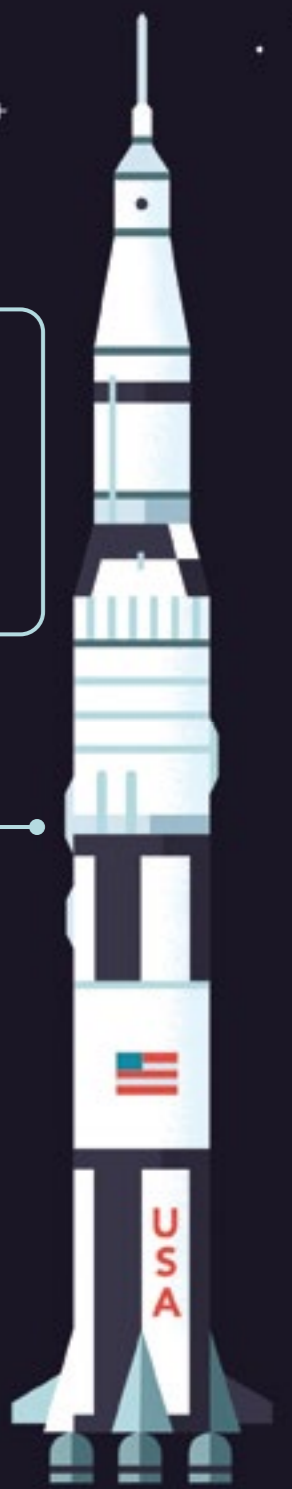
Without the help of these rockets, we might not have explored space as much as we have!



SLS

This spaceship was used for the Apollo missions and carried the first men to the moon. On July 20, 1969 NASA astronauts Neil Armstrong and Buzz Aldrin set foot on the dusty surface of the Moon.

This spaceship is supposed to replace NASA's retired space shuttles. It is a spacecraft that will help us travel farther than we've ever gone before.



Saturn V



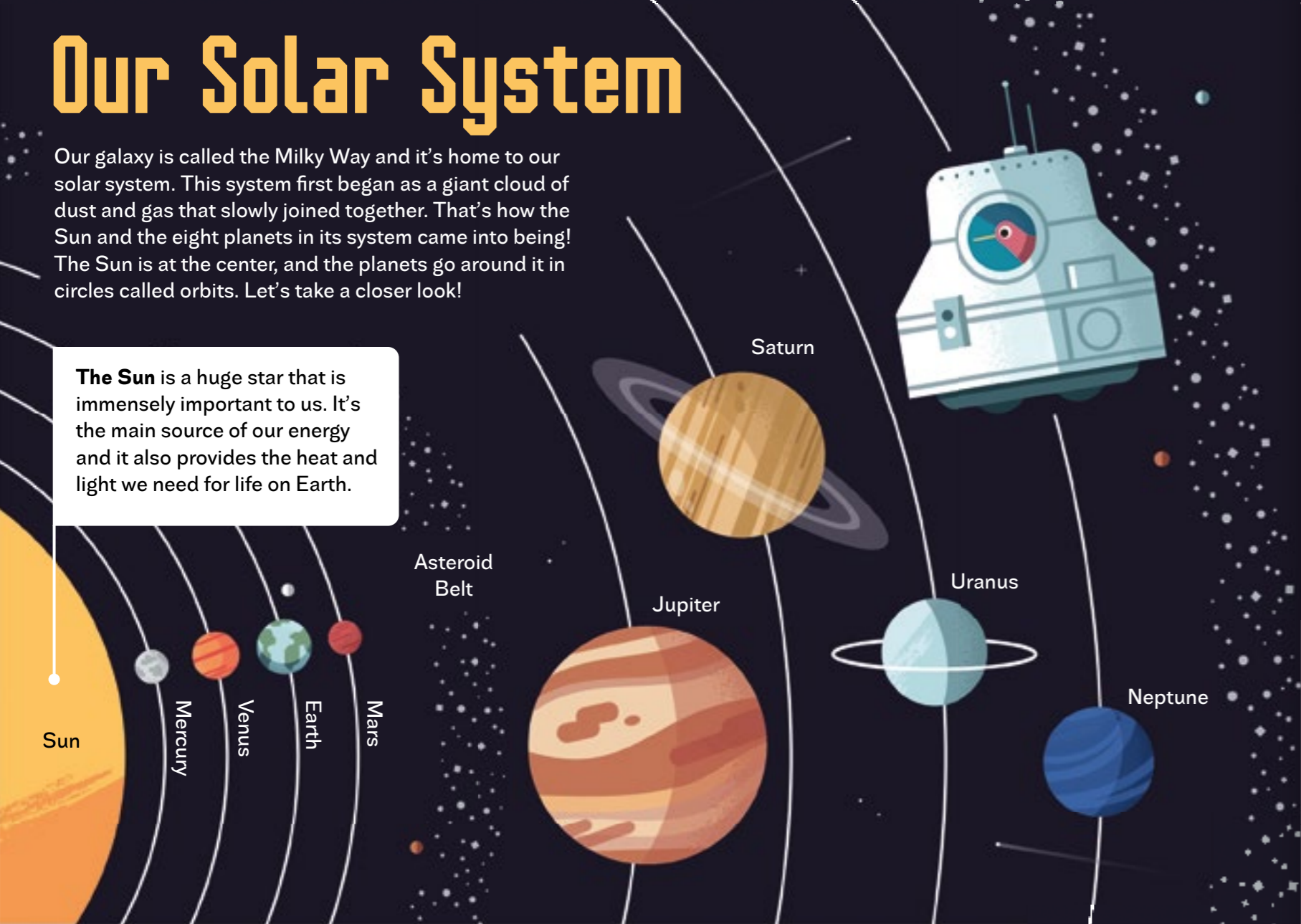
Vostok 1

This spaceship helped to take the first human into space—a Russian cosmonaut named **Yuri Gagarin**. On April 12, 1961 it set off on its voyage, completing one orbit around Earth that lasted 1 hour 48 minutes.

Our Solar System

Our galaxy is called the Milky Way and it's home to our solar system. This system first began as a giant cloud of dust and gas that slowly joined together. That's how the Sun and the eight planets in its system came into being! The Sun is at the center, and the planets go around it in circles called orbits. Let's take a closer look!

The Sun is a huge star that is immensely important to us. It's the main source of our energy and it also provides the heat and light we need for life on Earth.



Mercury

Mercury is a rocky planet. It's the smallest and closest planet to the Sun. It doesn't really have an atmosphere.



Venus

There are many active volcanoes on the surface of Venus. It's actually the hottest planet in our solar system!



Earth

Our rocky planet consists of four layers—three solid ones and one liquid that is extremely hot—the liquid that comes out of volcanoes. Oceans make planet Earth special.



Mars

Mars is a cold desert world. Sometimes it's called the Red Planet—because of rusty iron in the ground. Like Earth, it has seasons, polar ice caps, volcanoes, and canyons.



Jupiter

Jupiter is so enormous it's called a gas giant. Because of the gases, we would be unable to stand on Jupiter's surface. We would fall right through it! There are over 60 moons orbiting this planet.



Saturn

This planet is also made of gas, and it's known for its visible rings, which are made of rocks, dust, and ice.



Uranus

This planet is very far away from the Sun. There might be diamonds in its center! Unfortunately, they are surrounded by a hot boiling ocean.



Neptune

Neptune is very stormy, as well as dark and windy. It's an icy giant planet made of gases. It's the last of the planets in our solar system.



What a view! Can you name all the planets in the solar system?

What makes Earth special?

Our home is the only planet we have found that has life on it. Why is that?



Above the surface there is a mix of gases called the **atmosphere**. It surrounds our planet like a jacket, keeps us warm, gives us oxygen to breathe, and protects us from incoming meteorites.



Earth is just the right distance from the Sun—it doesn't boil or freeze!



We have water! It covers two-thirds of our surface. All animals and plants need water to live.

How big are the planets?

Planets are incredibly huge! To get an idea of how big they are, we can compare them to fruits. If the Earth were a strawberry, which planets would be smaller and which ones bigger? Take a look!



Mercury



Venus



Earth



Mars



Jupiter



Saturn



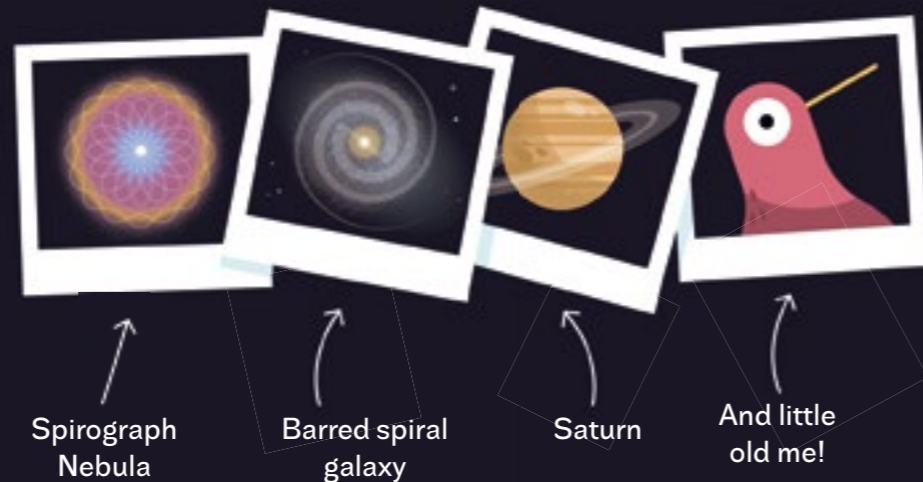
Uranus



Neptune

Space explorers

We've been exploring space with the help of many machines. Some of them, such as telescopes, are helping us from Earth. With rockets, people have sent many cosmic machines right into orbit. Everything in space is too far away, so these machines allow us to explore and learn about it more.



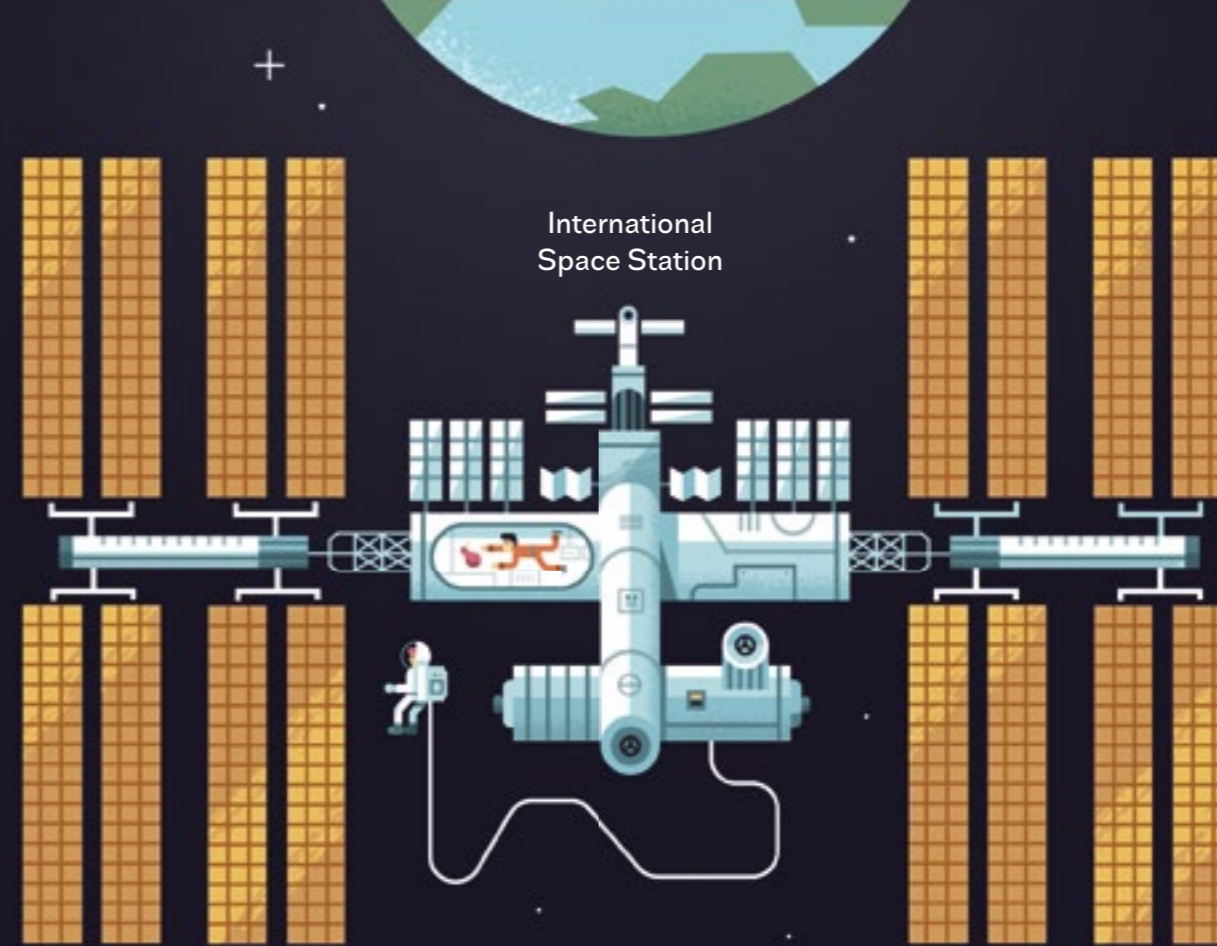
Hubble Space Telescope

This school bus-sized telescope is a real grandpa. For over 30 years, it's been drifting around in orbit. With its finder scope, it took many magnificent photos of planets, stars, as well as faraway galaxies. Hubble has seen farther into space than any other machine.



Satellites

The orbit around the Earth is like a busy highway, full of satellites. They are super useful for us—some take pictures of our planet while others beam TV signals, phone calls, and the internet around the world. Some even help with weather forecasting!

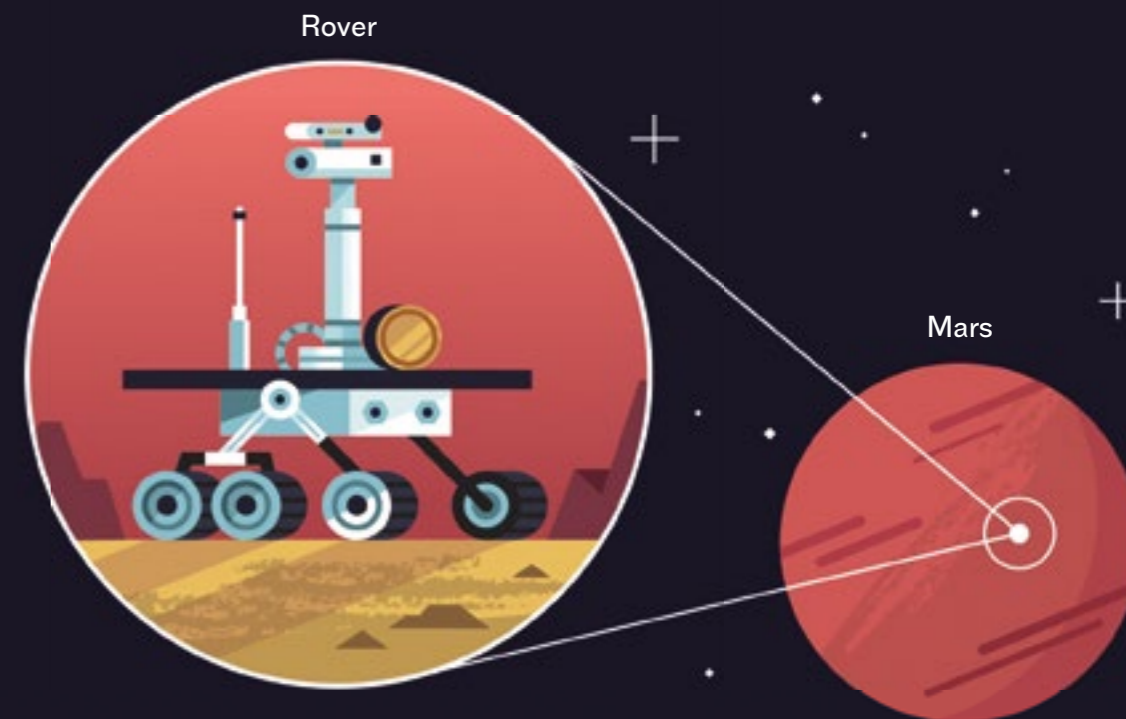


The ISS [International Space Station]

The ISS is one of mankind's most wonderful creations. It's as big as a football field, yet it's floating right above our planet! It's made up of many rooms, called **modules**, which are connected by hallways. Over the years, it's been home to astronauts from all over the world. During their mission, they usually stay there for half a year. What do they do up there? They carry out experiments mostly. They also exercise a lot and do everyday tasks. Sometimes they even get to walk around in space.

Mars Rovers

Rovers are cosmic vehicles—smart **robots** that explore the surface of the planet Mars. They are as big as a car, but built for the harsh martian environment. Rovers Spirit and Opportunity went on a quest to find out whether there was ever water on Mars. The newest rover, Perseverance, has a different task: to find out if there are any signs of life. In the future, there will be even more rovers from all over the world exploring this red planet.



The future

One day we might have spaceships powerful enough for us to travel to other galaxies or even settle on faraway planets that have hospitable conditions similar to Earth's.

Such spacecraft would be able to travel close to the **speed of light**. Which is super fast!

Or they might take a quicker route through a **wormhole**. They would enter it at one end and exit from the other. It's like using a space subway that takes you from one place to another.

We might meet other forms of life. However, some might not be huggable . . .

. . . or they might be so big they would make us look like teeny weeny dwarfs . . .

. . . or they might be much more advanced than us . . .

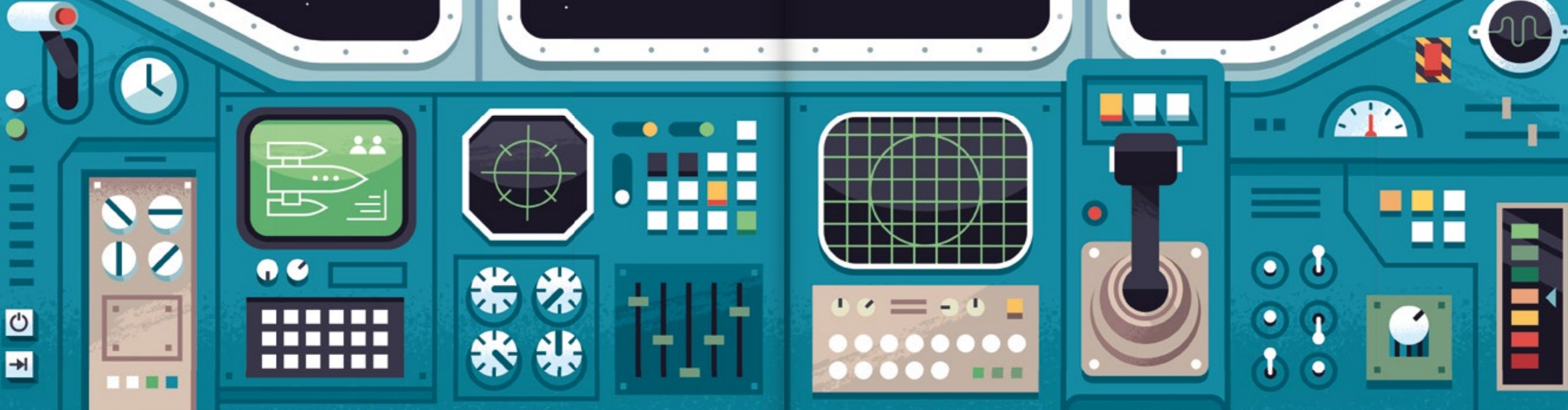
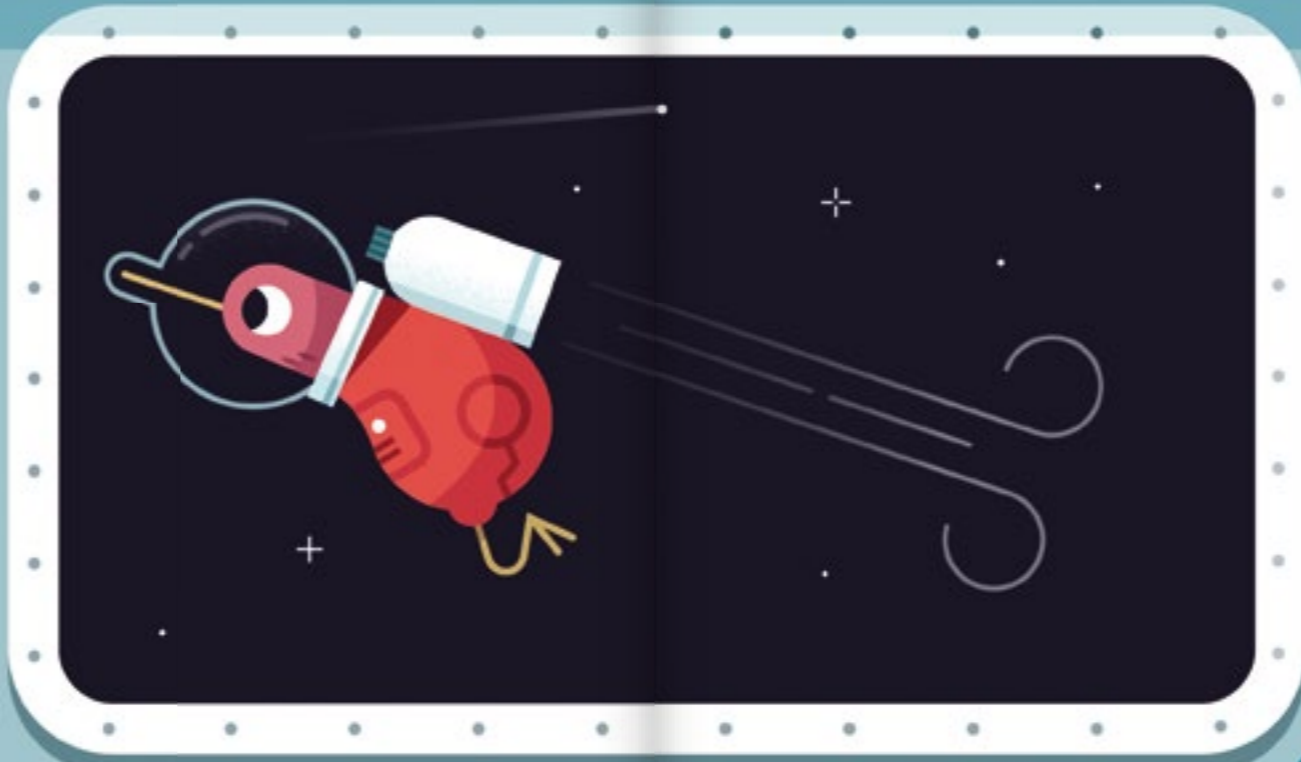
. . . or they might be living in a completely different environment.

Whatever they're like, they will surely be spectacular!



Congratulations!

Look at us. We are true space explorers who know space like the back of our hands! Would you like to try driving the spaceship on your own? All aboard then! Hop in, commander. Let's set off on our next adventure!



Is space the number one topic you're interested in?
Would you like to learn what breathtaking objects
and man-made machines are flying around out there?
Would you like to become an astronaut and see
everything with your own eyes?

Karl the kiwi bird is interested in just that. His biggest
dream is to visit space as an astronaut.

Together you'll learn many interesting things about
all kinds of spacecraft. You'll meet the most famous
types and also catch a glimpse of what goes on
before you even get to go to space—astronaut
training and liftoff included!

Join Karl in his spacecraft, get to know the solar
system, and even more! Who knows what is hiding
beyond our galaxy . . .



All aboard!
Get ready
for liftoff!



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